

Clinton-Glen Gardner School District



Curriculum Management System

SCIENCE

Grade: 6

August 2016

*** For adoption by all regular education programs as specified and for adoption or adaptation by all Special Education Programs in accordance with Board of Education Policy #2200.**

Board Approved: August 24, 2016

CLINTON-GLEN GARDNER SCHOOL DISTRICT

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Acknowledgments

The following individuals are acknowledged for their assistance in the preparation of this Curriculum Management System:

Writers' Names: Kate Lascelle
Stacy Viotto

Clinton-Glen Gardner School District

Mission

The Clinton-Glen Gardner School District is a community who values traditions. Our MISSION is to nurture and cultivate each child to be a compassionate, curious, and creative thinker, entrusted and empowered to build and lead the future.

Philosophy

Science, engineering, and technology influence and permeate every aspect of modern life. Some knowledge of science and engineering is required to engage with the major public policy issues of today as well as to make informed everyday decisions, such as selecting among alternative medical treatments or determining how to invest public funds for water supply options. In addition, understanding science and the extraordinary insights it has produced can be meaningful and relevant on a personal level, opening new worlds to explore and offering lifelong opportunities for enriching people's lives. In these contexts, learning science is important for everyone, even those who eventually choose careers in fields other than science or engineering.

The Next Generation Science Standards (NGSS) are K–12 science content standards. Standards set the expectations for what students should know and be able to do. The NGSS were developed by states to improve science education for all students.

A goal for developing the NGSS was to create a set of research-based, up-to-date K–12 science standards. These standards give local educators the flexibility to design classroom learning experiences that stimulate students' interests in science and prepares them for college, careers, and citizenship. The CPS Science Curriculum is designed to address the goals and philosophy of the New Jersey Next Generation Science Standards.

**Grade 6
Science**

Scope and Sequence

Quarter I	
<p>Unit 1: Earth's Systems</p> <ul style="list-style-type: none"> • Earth materials • Rock Cycle • Earth's crust • Water cycle • Currents and erosion 	
<p>(The ones that apply for these units are in bold)</p>	
<p><u>21st Century Skills</u></p> <ol style="list-style-type: none"> 1. Creativity & Innovation 2. Critical Thinking & Problem Solving 3. Communication & Collaboration 4. Media Literacy 5. Information Literacy 6. Information, Communication & Technology 	<p><u>Cross Cutting Concepts</u></p> <ol style="list-style-type: none"> 1. Patterns 2. Cause and Effect 3. Scale, Proportion and Quantity 4. System and System Models 5. Energy and Matter: flows, cycles and conservation 6. Structure and Function 7. Stability and Change
<p><u>21st Century Themes</u></p> <ol style="list-style-type: none"> 1. Global Awareness 2. Financial, Economic, Business and Entrepreneurial Literacy 3. Civic Literacy 4. Health Literacy 5. Environmental Literacy 	<p><u>Scientific and Engineering Practices</u></p> <ol style="list-style-type: none"> 1. Asking questions or defining a problem 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations or designing a solution 7. Engaging in an argument from evidence 8. Obtaining, evaluating and communicating information

Technology Infusion

<http://www.state.nj.us/education/>, Internet, Web Quests, content-related websites, wireless laptop computers, Chromebooks, computer laboratory, classroom computers, SMART Boards, CDs, DVDs, webinars, video streaming, podcasting

Differentiation

Refer to CPS Differentiation Tool Kit

Assessment

District End of Unit Benchmark

Various opportunities during lab investigations for formative assessment and anecdotal notes

During Work Period adjust lessons for individual students and small groups of students based on formative and summative data (Go back and re-teach for those that did not meet standard on benchmark and plan accordingly for those that exceeded benchmark)

Quarter II

Unit 2: History of Earth

- Theories (Continental Drift, Sea Floor Spreading)
- Mountain Building
- Plate tectonics
- Fossil Record

(The ones that apply for these units are in bold)

21st Century Skills

1. **Creativity & Innovation**
2. **Critical Thinking & Problem Solving**
3. **Communication & Collaboration**
4. **Media Literacy**
5. **Information Literacy**
6. **Information, Communication & Technology**

Cross Cutting Concepts

1. Patterns
2. **Cause and Effect**
3. **Scale, Proportion and Quantity**
4. System and System Models
5. Energy and Matter: flows, cycles and conservation
6. Structure and Function
7. **Stability and Change**

21st Century Themes

1. **Global Awareness**
2. Financial, Economic, Business and Entrepreneurial Literacy
3. Civic Literacy
4. Health Literacy
5. **Environmental Literacy**

Scientific and Engineering Practices

1. Asking questions or defining a problem
2. **Developing and using models**
3. **Planning and carrying out investigations**
4. **Analyzing and interpreting data**
5. Using mathematics and computational thinking
6. **Constructing explanations or designing a solution**
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Quarter III

Unit 3: Weather and Climate

- Air Masses, Weather Fronts, Currents
- Climate

Unit 4: Human Impacts

- Climate and human influence
- Natural hazards, predictions and engineering protections
- Population and Earth's resources

(The ones that apply for these units are in bold)

21st Century Skills

1. Creativity & Innovation
2. **Critical Thinking & Problem Solving**
3. **Communication & Collaboration**
4. **Media Literacy**
5. **Information Literacy**
6. **Information, Communication & Technology**

Cross Cutting Concepts

1. **Patterns**
2. **Cause and Effect**
3. Scale, Proportion and Quantity
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Quarter IV

Unit 5: Space Systems

- Sun-Earth-Moon system and patterns
- Scale model of the solar system

(The ones that apply for these units are in bold)
21st Century Skills

1. **Creativity & Innovation**
2. **Critical Thinking & Problem Solving**
3. **Communication & Collaboration**
4. **Media Literacy**
5. **Information Literacy**
6. **Information, Communication & Technology**

Cross Cutting Concepts

8. **Patterns**
9. **Cause and Effect**
10. **Scale, Proportion and Quantity**
11. **System and System Models**
12. Energy and Matter: flows, cycles and conservation
13. Structure and Function
14. Stability and Change

21st Century Themes

1. **Global Awareness**
2. **Financial, Economic, Business and Entrepreneurial Literacy**
3. Civic Literacy
4. Health Literacy
5. **Environmental Literacy**

Scientific and Engineering Practices

1. Asking questions or defining a problem
2. **Developing and using models**
3. **Planning and carrying out investigations**
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Suggested days of Instruction	Curriculum Management System	Topic: Earth's Systems	
	Subject/Grade Level: Grade 6 Science	Goal 1: The Earth's Systems unit leads students to understand the materials in Earth's crust and how it changes over time.	
	Objectives / Cluster Concepts / Disciplinary Core Ideas (DCIs) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
Sept.	<p>1.1 Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process (MS-ESS2-1.)</p> <p>1.2 Construct a scientific explanation based on evidence for how the uneven distribution of Earth's mineral energy, [and groundwater resources] are the result of past and current geoscience processes (MS-ESS3-1.)</p> <p>1.3 Develop a model to describe the cycling of water through Earth's systems driven by energy from the Sun and the force of gravity. (MS-ESS2-4.)</p>	<p>Essential Questions:</p> <p>What resources does Earth's crust consist of? What role does water play at and below Earth's surface? What processes affect Earth's resources? Where does the energy to fuel these processes come from?</p> <p>Conceptual Understandings:</p> <p>The resources that comprise Earth's surface are finite and unevenly distributed.</p> <p>Matter, such as minerals and water, cycle within the planet's systems.</p> <p>The energy that fuels the rock cycle largely stems from Earth's hot interior, while the water cycle draws its energy from the Sun.</p> <p>This energy flow can result in both chemical and physical changes to Earth's materials.</p>	<p>Learning Activities:</p> <p>Mineral Properties investigation Rock Cycle interactive Rock Type compare/ contrast writing Sterling Hill Mining Museum Trip Scale Model of Earth's Interior Water Cycle demonstration Water cycle flow chart Melting, Evaporation and Condensation lab</p> <p>Assessment Models:</p> <p>Quizzes/ tests Science Notebook Comprehension Checkpoints Group Discussions Google classroom "blogs" Compare/ contrast essays Lab Reports</p> <p>Additional Resources:</p> <p>Brain Pop videos Smartboard water cycle interactive: http://exchange.smarttech.com/search.html?q=water%20cycle Rock Cycle interactive: https://www.learner.org/interactives/rockcycle/ USGS website: http://water.usgs.gov/edu/watercycle-kids.html</p>

Suggested days of Instruction	Curriculum Management System	Topic: History of Earth	
	Subject/Grade Level: Grade 6 Science	Goal 2: By exploring the History of Earth Unit students will construct knowledge from evidence found in rocks to outline the 4.6 billion-year-old history of Earth and explain the geoscience processes that have occurred and continue.	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
Oct.	<p>2.1 Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6 billion-year-old history. (MS-ESS1-4.)</p> <p>2.2 Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. (MS-ESS2-2.)</p> <p>2.3 Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. (MS-ESS2-3.)</p>	<p>Essential Questions:</p> <p>How does the movement of tectonic plates impact the surface of our Earth?</p> <p>What geoscience process shape Earth's surface?</p> <p>How do people figure out that the Earth has changed over time?</p> <p>Conceptual Understandings:</p> <p>Scientists hypothesize and then create theories based on observations coupled with evidence to support those ideas.</p> <p>Physical evidence can explain processes and phenomena.</p> <p>Continental Drift is a theory that the surface of Earth, which is divided into plates, is in constant motion due to forces beneath Earth's crust.</p> <p>Volcanism is responsible for the formation of new land.</p> <p>"The fossil record is life's evolutionary epic that unfolded over four billion years as environmental conditions and genetic potential interacted in accordance with natural selection. "(www.fossilmuseum.net/fossilrecord.htm)</p>	<p>Learning Activities:</p> <p>PBS Learning Media: "Continental Drift- What's the Big Idea?"</p> <p>Sea Floor Spreading kinesthetic activity</p> <p>Mountain Building modeling lab</p> <p>Faults flip chart compare/ contrast</p> <p>Historical Earthquake research</p> <p>Anatomy of a volcano foldable</p> <p>Volcano compare/ contrast writing</p> <p>Pompeii mini-unit</p> <p>Viscosity lab</p> <p>Earth's timeline</p> <p>Observing and analyzing fossils</p> <p>Assessment Models:</p> <p>Quizzes/ tests</p> <p>Science Notebook</p> <p>Comprehension Checkpoints</p> <p>Group Discussions</p> <p>Google classroom "blogs"</p> <p>Compare/ contrast essays</p> <p>Lab Reports</p> <p>Additional Resources:</p> <p>Brain Pop videos</p> <p>Mountain Building music video</p>

Suggested days of Instruction	Curriculum Management System	Topic: History of Earth	
	Subject/Grade Level: Grade 6 Science	Goal 2: By exploring the History of Earth Unit students will construct knowledge from evidence found in rocks to outline the 4.6 billion-year-old history of Earth and explain the geoscience processes that have occurred and continue.	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
			USGS website: www.usgs.gov PBS Learning Media:

Suggested	Curriculum Management System	Topic: Weather and Climate
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		<p>Goal 3: Over the course of the Weather and Climate Unit students will construct an understanding of how factors within the Earth System are affected by energy from the sun to produce weather and climate factors that are dynamic.</p>	
Dec.	<p>Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's)</p> <p>The student will be able to:</p>	<p>Essential Questions, Conceptual Understandings</p>	<p>Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model</p>
	<p>3.1. Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. (MS-ESS-2-5.)</p> <p>3.2. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. (MS-ESS-2-6.)</p> <p>3.3. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. (MS-ESS-2-5.)</p>	<p>Essential Questions:</p> <p>What factors interact and influence weather and climate? How can data be used as evidence? What has caused global temperatures to rise?</p> <p>Conceptual Understandings:</p> <p>The complex patterns of the changes and movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents are major determinants of local weather.</p> <p>Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents.</p> <p>Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms and living things.; which vary with latitude, altitude, local and regional geography</p> <p>Weather can only be predicted probabilistically due to the complex nature of weather patterns.</p> <p>The ocean exerts a major influence on weather and climate by absorbing energy from the Sun, releasing it over time, and globally redistributing it through ocean currents.</p> <p>Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities.</p>	<p>Learning Activities:</p> <p>Density and water lab Temperature and melting (Ice cube lab) Create a cloud demonstration Fog lab Convection models Global Winds poster project Weather data collection Weather Map game (Ranger Rick Nature Scope) Weather Forecast PBA Climate graphing</p> <p>Assessment Models:</p> <p>Quizzes/ tests Science Notebook Comprehension Checkpoints Group Discussions Google classroom "blogs" Compare/ contrast essays Lab Reports PBA</p> <p>Additional Resources:</p> <p>Ranger Rick Nature Scope series Where the River Begins by Thomas Locker Red Bull Strato Jump video: http://www.redbullstratos.com/the-mission/world-record-jump/ Jump video with data: https://www.youtube.com/watch?v=raiFrxbHxV0 Weather Underground, Maps and Current</p>

Suggested days of Instruction	Curriculum Management System <u>Subject/Grade Level:</u> Grade 6 Science	Topic: Weather and Climate	
		Goal 3: Over the course of the Weather and Climate Unit students will construct an understanding of how factors within the Earth System are affected by energy from the sun to produce weather and climate factors that are dynamic.	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
			Conditions: https://www.wunderground.com/us/nj/clinton?MR=1 NOAA website: http://www.noaa.gov/ Games- http://games.noaa.gov/welcome.html

Suggested days of Instruction	Curriculum Management System Subject/Grade Level: Grade 6 Science	Topic: Human Impact	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
Jan.-March	<p>4.1. Analyze and interpret data on natural hazards to forecast future catastrophic event and inform the development of technologies to mitigate their effects. (MS-ESS3-2.)</p> <p>4.2 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment (MS-ESS3-3.)</p> <p>4.3 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth systems. (MS-ESS3-4.)</p> <p>4.4 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. (MS-ETS1-1)</p>	<p>Essential Questions:</p> <p>How do human activities affect Earth systems? How can natural hazards be predicted?</p> <p>Conceptual Understandings:</p> <p>Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species.</p> <p>Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events.</p> <p>Changes to Earth's environments can have positive and negative impacts on different living things.</p> <p>Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless activities and technologies involved are engineered otherwise.</p> <p>Engineering and design, together with predictive data, can provide both tools and solutions to keep communities safer in the face of natural disasters,</p>	<p>Learning Activities:</p> <p>Science in the News Measuring weather and catastrophes History of Earthquakes in the US research Engineering safer buildings activity</p> <p>Assessment Models:</p> <p>Quizzes/ tests Science Notebook Comprehension Checkpoints Group Discussions Google classroom "blogs" Compare/ contrast essays Lab Reports Poster Project and presentations PBA Predicting the Weather</p> <p>Additional Resources:</p> <p>News ELA site: www.newsela.com USGS website: www.usgs.gov Scholastic weather watchers site: http://teacher.scholastic.com/activities/wwatch/</p>

Suggested days of Instruction	Curriculum Management System <u>Subject/Grade Level:</u> Grade 6 Science	Topic: Human Impact	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
	4.5 Evaluate competing design solutions using a systemic process to determine how well they meet the criteria and constraints of the problem. (MS-ETS1-2)		

Suggested days of Instruction	Curriculum Management System <u>Subject/Grade Level:</u> Grade 6 Science	Topic: Space Systems	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
March	<p>5.1. Develop and use a model of the Earth-Sun-Moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons (MS-ESS1-1.)</p> <p>5.2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. (MS-ESS1-2.)</p> <p>5.3. Analyze and interpret data to determine scale properties of objects in the solar system</p>	<p>Essential Questions:</p> <p>How do the relative positions of the Earth, Sun and Moon cause seasons, eclipse and phases?</p> <p>What role does gravity play in the universe?</p> <p>How are models helpful and limited in explaining relationships and phenomena?</p> <p>Conceptual Understandings:</p> <p>Earth and its solar system are part of the Milky Way galaxy, which is just one of countless galaxies in the universe.</p> <p>The tilt of the Earth on its axis and the directness of the Sun's rays, not proximity to the sun, is the cause for seasons.</p> <p>From Earth, the amount of the Moon that is lit by the Sun appears to change daily and with a regular pattern.</p> <p>Patterns of the apparent motion of the Sun, Moon and the stars in the sky can be observed, predicted and explained</p>	<p>Learning Activities:</p> <p>Moon Journal Moon phase projects Planet Trading cards Calculate and create a scale model of the solar system Star lab week</p> <p>Assessment Models:</p> <p>Quizzes/ tests Science Notebook Comprehension Checkpoints Group Discussions Google classroom "blogs" Compare/ contrast essays Lab Reports</p> <p>Additional Resources:</p> <p>Brain Pop videos</p>

Suggested days of Instruction	Curriculum Management System Subject/Grade Level: Grade 6 Science	Topic: Space Systems Goal 5: Through their study of Space Systems students will understand the relative movements, identify patterns and explore the use of models as effective tools for understanding the Earth-Sun and Moon systems that are too large to observe closely.		
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model	
		<p>with models.</p> <p>The solar system consists of the Sun and a collection of objects, including planets, their moons, meteors, comets and asteroids that are held in orbit around the Sun by its gravitational pull on them.</p> <p>The solar system appears to have formed from a disk of dust and gas, drawn together by gravity.</p> <p>Models are helpful but can have limitations when explaining eclipses, season, phases of the moon and the scale of the solar system.</p>	<p>Excellent Moon facts site: http://www.primaryhomeworkhelp.co.uk/moon/facts.htm Planets for kids: www.planetsforkids.org Scale Model of the Universe: http://htwins.net/scale2/</p>	

Suggested days of Instruction	Curriculum Management System Subject/Grade Level: Grade 6 Science	Topic: Space Systems Goal 5: Through their study of Space Systems students will understand the relative movements, identify patterns and explore the use of models as effective tools for understanding the Earth-Sun and Moon systems that are too large to observe closely.	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model